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**December 20, 2002**

**Mr. James E. Lyons**  
Director, New Reactor Licensing Project Office  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

**SUBJECT: Resolution of Generic Topic ESP-6 (Plant Parameters Envelope Approach for ESP)**

**Dear Mr. Lyons:**

During several public meetings between July 17 and December 5, 2002, and in our letter to you dated August 9, we discussed matters related to preparation and review of early site permit (ESP) applications using the plant parameters envelope (PPE) approach. The PPE approach facilitates the ESP process when the type of plant to be built on a candidate site is not known.

Our extensive discussions have covered the PPE concept and process, examples of the PPE approach applied to key safety and environmental reviews for ESP, and important implementation issues related to satisfying NRC and NEPA requirements. We request that, by reply to this letter, the NRC confirm the understandings and expectations that resulted from our discussions of the PPE approach. These are identified below and described more fully in Enclosure 1. To provide for timely resolution of generic issues and continued progress toward submittal of ESP applications in 2003, we request that NRC respond by February 1, 2003.

**ESP-6 Understanding and Expectations**

- 1. ESP applications may use the PPE approach as a surrogate for actual facility information to support required safety and environmental reviews. Applications would not reference any specific reactor technology with the intent that the resulting ESP would be applicable for a range of reactor designs, including NRC certified designs, designs for which NRC certification is currently in progress or contemplated, and future designs.**

2. The PPE must contain sufficient information, i.e., design parameters, to support site suitability evaluations by the ESP applicant and corresponding reviews by the NRC. In particular, the PPE must support evaluations and reviews to determine that the environmental impacts associated with construction and operation of one or more new nuclear plants are acceptable.
3. Design parameter values are chosen by the ESP applicant to bound a range of possible future designs. PPE values are based on certified design information and best available information for as yet uncertified designs.
4. PPE values may differ among ESP applicants. For example, PPEs may differ due to differences in the technology options considered by each applicant and differences in margins that may be applied to account for uncertainties in design parameter information provided by reactor vendors.
5. The PPE will represent composite parameters not indicative of any specific reactor design. Bounding PPE values would be accepted as presented in the ESP application. NRC approval/endorsement of PPE values will not be requested and is not necessary, i.e., PPE values will not be reviewed for correctness.
6. Granting of an ESP by the NRC does not indicate NRC approval of the site for any specific plant or type of plant. Rather, a PPE-based ESP indicates that the site is acceptable for construction and operation of plant(s) having characteristics that fall within the site characteristics and design parameters approved in the ESP.
7. Later verification and validation that the actual design chosen for the site is acceptable would occur during the combined license or construction permit stage.
8. ESP applicants bear the risk that the design ultimately selected for the site might fall outside the approved envelope in one or more respects. Design characteristics proposed at COL that are not bounded by the terms and conditions of the ESP may be subject to NRC review and public hearing opportunity in the COL proceeding.
9. Site characteristics are complementary to the bounding design parameters of the PPE, and these two types of information, including associated evaluations and analyses, will make up the bulk of information to be presented in ESP applications. It is expected that the information contained in the ESP application will address the information requested in the ESP Review Standard currently under development. This Review Standard is expected to reflect

existing regulations concerning NRC staff reviews in the environmental, site safety, and emergency preparedness areas.

As discussed in Enclosure 1, a combination of site characteristics and PPE values will comprise the ESP bases, or "permit bases," that will be the focus for comparison at COL with design characteristics of the actual plant proposed for the site.

10. The PPE approach is fully consistent with existing requirements governing NRC safety reviews for ESP. In particular, compliance with Section 52.17(a)(1), which pertains only to the radiological dose consequences of postulated accidents contained in the safety assessment, will be accomplished in the ESP application by determining the site P/Q, including the effect of SSCs, if any, that bear significantly on the result. Compliance with Section 52.17(a)(1) is the subject of generic topic ESP-7. Understandings and expectations concerning ESP-7 are addressed in the separate issue resolution letter for that topic dated December 20, 2002.
11. The PPE approach is also fully consistent with NEPA requirements and the NRC's Part 51 implementing regulations concerning environmental review of ESP applications. In particular, NEPA consideration of alternative sites is the subject of generic topic ESP-18a. Understandings and expectations concerning ESP-18a are addressed in the separate issue resolution letter for that topic dated December 20, 2002.

Regarding consideration of environmental impact mitigation alternatives, as discussed in Enclosure 1, ESP applications will identify the scope of mitigation alternatives considered and include additional information beyond that contained in the PPE to support the NEPA required reviews in this area.

As we discussed during our October 17 public meeting, ESP applicants are compiling design parameter information from reactor vendors into a "PPE worksheet" to facilitate comparison of data and identification of bounding parameter values for use in ESP applications. While we intended to provide the "PPE worksheet" at this time, Revision 0 of the worksheet has not yet been completed. ESP applicants expect to integrate necessary information from the reactor vendors and complete Revision 0 of the PPE worksheet by January 29, 2003, and we expect to provide it to you then. As discussed in Enclosure 1, the PPE worksheet will not be part of ESP applications and is to be provided only for NRC pre-application information and feedback; no technical review of the PPE worksheet is required. Thus, the delay in providing the PPE worksheet is not expected to impact the schedule for the NRC response to this letter.

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As the PPE approach is fundamental to the objectives of the pilot ESP applicants, we are pleased that our discussions of this important topic have progressed to the point of documenting significant common understandings and expectations. To assist the NRC staff in preparing for review of ESP applications based on the PPE approach, we would welcome the opportunity to further discuss implementation issues.

An updated status listing of generic ESP topics is provided as Enclosure 2.

We look forward to your confirmation of the understandings and expectations described above related to the PPE approach (ESP-6). If you have any questions concerning this request, please contact me ([rls@nei.org](mailto:rls@nei.org) or 202-739-8128) or Russ Bell ([rjb@nei.org](mailto:rjb@nei.org) or 202-739-8087).

Sincerely,

***Original Signed By:***

Ron Simard

Enclosures

c: Ronaldo V. Jenkins, NRC/NRR  
Document Control Desk

## **ESP-6 Understandings and Expectations**

### **Background and Introduction**

Historically, the NRC has reviewed proposed sites and designs in combination and approved the site/design combination simultaneously. Part 52 provides for the option to secure separate early approvals for proposed sites, designs or both. In particular, the Part 52 early site permit (ESP) process reflects the longstanding Commission objective to decouple siting from design and is central to the early resolution of safety and environmental issues, a principal policy objective of Part 52. A new approach and new guidance based on use of a plant parameter envelope (PPE) are needed to support evaluation and approval of sites for future nuclear power plants as a separate matter from, and well in advance of, decisions on what and when to build.

Strong policy basis exists for the PPE approach. First, it provides combined operating license (COL) applicants with essential flexibility to select the best technology available at the time the decision to build is made. An ESP that would limit this flexibility would not be in the public interest and would be of severely diminished value to prospective applicants. Second, it provides the NRC with the information necessary for its review and issuance of ESPs. And third, the PPE approach facilitates the combined license process by clearly identifying the set of parameters on which the acceptability of a specific design for a particular site will be based.

Part 52 provisions for early design and site approvals necessitate that certain assumptions be made to facilitate NRC reviews. The PPE for ESP is analogous to the suite of site parameters that were assumed to facilitate design certification reviews. During design certification, actual site information is not known, but standard designs are pre-approved for sites that are bounded by the site parameters specified in the design certification. For ESP, the opposite situation exists. Information about the actual plant to be built is not known, but sites are pre-approved for plants that are bounded by the set of design parameters (i.e., the PPE) and site characteristics specified in the ESP.

Currently, three ESP applicants, Exelon, Entergy and Dominion, are readying applications for submittal to the NRC in 2003. Each of these pilot ESP applicants is using the PPE approach to prepare their applications because they have not made a decision to build a plant and have not selected the technology that might potentially be built on their sites in the future. The industry expects that this scenario may be typical of most ESP applications in the future. This is because ESPs are good for up to 20 years and are renewable, and it is not practical or prudent for applicants to specify the type of plant to be built given the range of promising technologies expected to become commercially available during that time.

The following discussion of ESP-6 understandings and expectations that have resulted from industry – NRC staff interactions concerning the PPE approach are organized as follows:

- PPE Concept and Process
- PPE Worksheet
- Site Characteristics, PPE values and the “Permit Bases”
- PPE approach conformity with Part 52
- PPE approach compatibility with NEPA/Part 51

Attachment 1 presents working definitions for important ESP-related terms.

### **ESP-6 Understandings and Expectations**

#### **PPE Concept and Process**

A PPE is a set of postulated design parameters that are expected to bound the characteristics of a reactor or reactors that might later be deployed at a site.

- In terms of safety reviews, this means that design characteristics of potential designs will be no more demanding from a site suitability perspective than the bounding design parameters in the PPE
- In terms of environmental reviews, this means that impacts of the selected design will not be significantly greater than impacts evaluated in the ESP using the bounding design parameters in the PPE.

For purposes of preparing and reviewing ESP applications, the PPE serves as a surrogate for actual facility information. For example, values for maximum building height; acreage for plant facilities, ponds, etc.; and cooling water requirements are among the hundred-plus design parameters specified in the PPE.

A forerunner of the current PPE was developed in the early 1990s as part of the ESP Demonstration Program, a joint project by the industry and the Department of Energy. As a result of the earlier and current efforts, appropriate design parameters have been identified for inclusion in the PPE through a systematic review of regulatory criteria and guidance, ESP application content requirements and experience with previous site suitability studies.

The PPE must contain sufficient information, i.e., design parameters, to support site suitability evaluations by the ESP applicant and corresponding reviews by the NRC. In particular, the PPE must support evaluations and reviews to determine

that the environmental impacts associated with construction and operation of one or more new nuclear plants are acceptable.

Design parameter values are selected by the ESP applicant. Values are chosen to bound a range of possible future facilities, including NRC certified designs, designs for which NRC certification is currently in progress or contemplated, and future designs. Certified design information and best available information from vendors for yet-to-be certified designs are compared, and bounding values are chosen for the PPE scope of parameters.

Each of the pilot ESP applicants is working with the same design information for the various certified and uncertified designs being used as the basis for the PPE (see related understanding and expectations below regarding the PPE Worksheet). However, PPE values may differ among ESP applicants. For example, a design that contributes one or more bounding values to applicant A's PPE may not be considered a candidate technology by applicant B, and therefore applicant B's PPE would reflect different bounding values for those parameters. In addition, applicant A's objective may be to site two plants, while applicant B seeks to site only one. Bounding values for parameters that depend on the number of units, e.g., cooling water requirements, would be a factor of two higher for applicant A. Bounding values for parameters such as building height might be identical for both applicants.

PPE values may also differ among ESP applicants because applicants may choose to include varying degrees of margin in certain bounding values to account for uncertainty in the design parameter information provided by vendors. Uncertainties exist because information for yet-to-be certified designs is subject to change as a result of NRC review and because certain design parameters, e.g., maximum cooling tower height, are outside the direct control and expertise of the reactor vendors who are supplying the information.

Granting of an ESP by the NRC does not indicate NRC approval of the site for any specific plant or type of plant. Rather, a PPE-based ESP indicates that the site is acceptable for construction and operation of plant(s) having characteristics that fall within the site characteristics and design parameters identified in the ESP.

Thus, it does not matter whether a particular plant is or is not considered when determining PPE bounding values. A site for which a PPE-based ESP has been granted is acceptable for any existing or future plant design that is bounded by the terms and conditions of the ESP. This is vitally important because ESPs that would limit their applicability to the designs considered in developing the bounding PPE would be of severely diminished value to prospective applicants.

The choice of values for the bounding PPE is completely at the discretion of the ESP applicant. As such, no NRC review for correctness of bounding PPE values is

expected or required, as approval of PPE values will not be requested as part of ESP applications. Rather, NRC reviews are expected to focus on verifying ESP applicant evaluations that demonstrate the acceptability of safety and environmental impacts associated with bounding PPE values. The ESP applicant bears the risk that the design ultimately selected for the site might fall outside the approved envelope in one or more material respects. As discussed below, aspects of the design proposed at COL that are not bounded by the terms and conditions of the ESP may be subject to NRC review and public hearing opportunity in the COL proceeding.

Except as provided by 52.39, matters resolved in an ESP shall be treated as resolved in a future COL proceeding. At COL, the NRC will consider any significant new environmental issue that was not resolved in the ESP or other previous licensing proceeding and will verify that design characteristics of the proposed plant fall within the site characteristics and design parameters (PPE) identified in the ESP. If one or more characteristics of the design proposed in a COL application are not bounded by the terms and conditions of the ESP, the safety implications and any additional environmental impact of such characteristics may be subject to NRC review and public hearing opportunity in the COL proceeding.

Generic topic ESP-21 focuses on understanding COL review requirements with respect to site suitability when an ESP is referenced. Understandings and expectations concerning ESP-21 will be addressed in a separate issue resolution letter for that topic.

An apt summary of the PPE approach and concept is provided in the Nov. 19, 2002, NRC document titled, "*Staff Expectations Regarding PPE*:"

The ESP applications would not reference any specific reactor technology with the intent that the resulting ESP would be applicable to the vast majority of future reactor designs. The bounding PPE values would be accepted as presented by the applicant without further inspection by the NRC staff and they would represent composite parameters not indicative of any specific reactor facility. The NRC staff would be requested to review these PPE values for use in making a determination regarding the acceptability of the proposed site for a possible future construction of a nuclear power plant. Later verification and validation that the actual design chosen for construction on the site was acceptable would occur during the combined license or construction permit stage.

We understand that the PPE approach may not be extensively discussed in the ESP Review Standard that is to be released shortly for trial use and comment. However, as identified during our November 5 public meeting with NRC senior managers, we understand that the staff plans to supplement or revise the Review Standard such



that needed guidance for review of ESP applications is in place before June 30, 2003, when the first applications are scheduled to be submitted.

Attachment 2 provides an example of an ESP granted by the NRC based on the use of the PPE approach as described above. It follows the form of a construction permit issued for a Part 50 licensed facility, with the content modified to demonstrate the nature of the conclusions that the NRC will make in the ESP context. We previously provided this sample ESP in a public meeting on August 22 and include it here again because it is important to consider the types of findings that the NRC would be expected to make in granting an ESP that is based on the PPE approach. The form and content of an ESP is the subject of generic topic ESP-22. Understandings and expectations concerning ESP-22 will be addressed in a separate issue resolution letter for that topic.

### PPE Worksheet

ESP applicants are compiling design parameter information from reactor vendors into a "PPE worksheet" to facilitate comparison of data and identification of bounding parameter values for use in ESP applications. The PPE worksheet will not be provided as part of ESP applications; ESP applications will include only the bounding values determined from the worksheet.

A sample page from the PPE worksheet is provided below for information. NRC pre-application review for information of the PPE worksheet is intended to enhance understanding as to the origin of bounding PPE values and how they are selected. Pre-application examination of this information is also expected to demonstrate that bounding PPE values to be included in ESP applications are based on actual nuclear plant designs and address NRC staff concerns as to the appropriateness and reasonableness of the information as a basis for ESP safety and environmental reviews.

No NRC technical review of PPE worksheet values is expected or required. Certified design information has been previously approved by the NRC; information on non-certified designs will be subject to detailed technical review in connection with either a design certification or COL proceeding. Lack of technical review of design information is consistent with the intended focus of ESP on sites, not designs.

ESP applicants are in the process of identifying bounding PPE values based on the best available information. The PPE worksheet continues to be refined to address gaps and improve the consistency of information identified by each reactor vendor, i.e., to provide for apples-to-apples comparisons. Moreover, vendor-specific design parameters may be modified, and thus bounding values to be reflected in ESP applications are subject to change.

In addition, the completeness of the PPE worksheet continues to be assessed to identify any new design parameters that should be added. In particular, additional design parameters necessary to support required ESP evaluations and NRC reviews may be identified in connection with industry review of the forthcoming ESP Review Standard.

ESP applicants expect to integrate necessary information from the reactor vendors and complete Revision 0 of the PPE worksheet by January 29, 2003. While the worksheet will remain a work-in-progress for the reasons discussed above, it will be sufficiently mature and we intend to provide the worksheet at that time for purposes of furthering NRC understanding of the PPE concept and as a basis for further discussion.

Plant Parameter	Values for Various Reactor Technologies										Bounding Value	Comments
	ATFTR (Single Unit) (1000 MWth) A-4	ATFTR (Single Unit) (1000 MWth) A-4	ATFTR (Single Unit) (1000 MWth) A-4	ATFTR (Single Unit) (1000 MWth) A-4	ATFTR (Single Unit) (1000 MWth) A-4	ATFTR (Single Unit) (1000 MWth) A-4	ATFTR (Single Unit) (1000 MWth) A-4	ATFTR (Single Unit) (1000 MWth) A-4	ATFTR (Single Unit) (1000 MWth) A-4	ATFTR (Single Unit) (1000 MWth) A-4		
1.1 Building Characteristics												
1.1.1 Height	125' 0"	250' 0"	(1)	100'	Building Height 117'	Building Height 117'	Building Height 117'	Building Height 117'	Building Height 117'	Building Height 117'	100'	
1.1.1 Foundation	20' 0" to top of basement	20' 0" to top of basement	(1)	40' 0"	20' 0" to top of basement	20' 0" to top of basement	20' 0" to top of basement	20' 0" to top of basement	20' 0" to top of basement	20' 0" to top of basement	40' 0"	
1.2 Power/Thermal												
1.2.1 Maximum Rated Power	10,000 MWth	10,000 MWth	(1)	10,000 MWth	10,000 MWth	10,000 MWth	10,000 MWth	10,000 MWth	10,000 MWth	10,000 MWth	10,000 MWth	
1.2.2 Core Load	50 MWth	50 MWth	(1)	50 MWth	50 MWth	50 MWth	50 MWth	50 MWth	50 MWth	50 MWth	50 MWth	
1.3 Safety Shutdown Characteristics												
1.3.1 Core Response Time	Regulatory Guide 1.0	Regulatory Guide 1.0	(1)	Regulatory Guide 1.0	Regulatory Guide 1.0	Regulatory Guide 1.0	Regulatory Guide 1.0	Regulatory Guide 1.0	Regulatory Guide 1.0	Regulatory Guide 1.0	Regulatory Guide 1.0	
1.3.2 Peak Thermal Power	0.25%	0.25%	(1)	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	
1.3.3 Thermal Power	Core 100 MWth	Core 100 MWth	(1)	Core 100 MWth	Core 100 MWth	Core 100 MWth	Core 100 MWth	Core 100 MWth	Core 100 MWth	Core 100 MWth	Core 100 MWth	
1.3.4 Core Thermal Power	100 MWth	100 MWth	(1)	100 MWth	100 MWth	100 MWth	100 MWth	100 MWth	100 MWth	100 MWth	100 MWth	

Footnote  
Column

PPE Worksheet General Layout  
(Typical)

### Site Characteristics, PPE Values and "Permit Bases"

As discussed above, the PPE represents a surrogate for actual facility information for purposes of ESP evaluations and reviews. Site characteristics, on the other hand, are the real physical, environmental and demographic features of a proposed facility location. Site characteristics are complementary to the bounding design parameters of the PPE, and these two types of information, including associated evaluations and analyses, make up the bulk of information to be presented in ESP applications.

It is expected that the information contained in the ESP application, including the PPE, site characteristics and associated evaluations and analyses, will address the information requested in the ESP Review Standard currently under development. This Review Standard is expected to reflect the existing regulatory guidance for performing NRC staff reviews in the environmental, site safety, and emergency preparedness areas.

For ESP, sites are characterized in much the same way they have in the past for construction permit applications. Site characteristics are established through data collection and/or analysis and are developed in accordance with NRC requirements and guidance. Also consistent with past practice, the site characterization presented in ESP applications will be reviewed by the NRC to verify it accurately and completely describes the site. This contrasts with the PPE, which, as discussed above, will be accepted as presented in ESP applications and will not be subject to technical review by the NRC staff. Examples of site characteristics are maximum wind speed, maximum snow loading, and seismicity, as well as man-made features such as population distribution and nearby industrial facilities.

Certain design parameters in the PPE correspond to site characteristics, while other design parameters do not. For example, maximum snow loading is both a characteristic of the site that is quantified based on meteorological data and an important parameter in the design of plant structures. In contrast, building height is solely associated with the design and has no corresponding site characteristic.

The ESP bases, or "permit bases" are the combination of site characteristics and bounding design parameter values from the PPE that will be compared at COL to the design characteristics of the actual proposed plant. Where a design parameter corresponds to a site characteristic, the site characteristic always becomes the permit basis for that parameter, and thus the focus of comparison at COL. This is consistent with the objective at COL to confirm that an actual proposed plant is suitable for the site. Where there is no corresponding site characteristic, the bounding design parameter value from the PPE becomes part of the "permit bases" and will be compared at COL to the corresponding design characteristic of the proposed plant.

The table below illustrates how the "permit bases" are established. In the case of building height, there is no corresponding site characteristic, so the bounding value of 234 feet becomes the permit basis for that parameter. Because snow load is a characteristic of the site, the snow load value determined for the site becomes the permit basis for snow load.

The table illustrates two possibilities when a site characteristic corresponds to a PPE design parameter. At Site A, the snow load determined for the site is less than the bounding value for snow load taken from the PPE, while at Site B, the reverse is true. In both cases, the permit basis is the snow load determined for the site, i.e., the site characteristic. At COL, the snow load design characteristic of the actual plant will be compared to the permit basis (site characteristic) established in the ESP. Case B illustrates that the site characteristic is always established as the permit basis, even when it exceeds the bounding value for the corresponding design parameter in the PPE. For Site B, snow load will be an issue subject to further NRC review and opportunity for public hearing at COL for any proposed plant that does not have a design characteristic for snow load equal to or greater than 80 psf.

Parameter	Bounding PPE Value	Site Characteristic	Permit Basis
Building Height	234 ft	None	234 ft
Snow Load (Site A)	50 psf	30 psf	30 psf
Snow Load (Site B)	50 psf	80 psf	80 psf

#### PPE Approach Conformity with Part 52

As discussed in our letter of Aug 9, 2002, the PPE approach, whereby the type of plant that may someday be built is not specified in an ESP application, is fully consistent with existing NRC requirements governing both ESP safety and environmental reviews. In particular, Section 52.17(a)(1) does not require ESP applications to specify the type of reactor or even the range of possible reactor types that may one day be built on ESP candidate sites. This provision gives considerable discretion as to how an applicant may define the facility characteristics to be used in evaluating the suitability of the site.

Moreover, the PPE approach is consistent with Section 52.21, which calls for the NRC to make a determination for ESP that "a reactor, or reactors, having characteristics that fall within the parameters for the site can be constructed and

operated without undue risk to the health and safety of the public.” Similar language is used in Section 52.17(a)(2), *Content of Applications*, and Section 52.18, *Standards for Review of Applications*.

The Commission directly addressed the anticipated lack of design information at time of ESP in the 1988 Statements of Consideration of the proposed Part 52 rule, concluding that the nuclear industry’s maturity with respect to site suitability determinations now allowed applicants and the agency “to propose and evaluate plant sites without plant design details [being available].”<sup>1</sup> As the NRC staff later aptly explained in SECY-91-041, “Although the specific type and design of the plant may not be known at the time of the ESP review, 10 CFR 52.17 requires the applicant to submit information (in an Environmental Report) that the staff can use to place an upper bound on the environmental effect of the plant’s operation” [emphasis added]. Thus the PPE approach is consistent with Part 52 requirements and Commission intent, and is indeed necessary for the ESP process to be workable and meaningful.

Nonetheless, the industry and NRC staff had several discussions on how the PPE approach would satisfy the ESP application requirements of Section 52.17(a)(1), which states in part,

“... The application must also contain a description and safety assessment of the site on which the facility is to be located. an analysis and evaluation of the major systems, structures and components that bear significantly on the acceptability of the site under the radiological consequence evaluation factors identified in Section 50.34(a)(1) of this chapter. Site characteristics must comply with Part 100 of this chapter.”

As discussed during a public meeting on December 5, 2002, compliance with Section 52.17(a)(1), which pertains only to the radiological dose consequences of postulated accidents contained in the safety assessment, will be accomplished in the ESP application by determining the site P/Q, including the effect of SSCs, if any, that bear significantly on the result. Generic topic ESP-7 focuses on how the requirements of Section 52.17(a)(1) may be met when the PPE approach is used in lieu of specific design information. Understandings and expectations concerning ESP-7 are addressed in the separate issue resolution letter for that topic.

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<sup>1</sup> Proposed Rule, ‘Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Reactors,’ 53 Fed. Reg. 32060 (Aug. 23, 1988).

PPE Approach Compatibility with NEPA/Part 51

Under the PPE approach, ESP applicants will identify the upper bounds of potential environmental impacts for the particular site for which an ESP is sought as a means of preserving the applicant's ability to choose the best design available when, in the future, a decision to build is made.

Section 52.18 addresses the standards for review of ESP applications and, as is highlighted below, mandates an environmental evaluation be conducted pursuant to the NRC's National Environmental Policy Act (NEPA) implementation regulations contained in 10 CFR Part 51.

*"In particular, the Commission shall prepare an environmental statement during review of the application, in accordance with the applicable provisions of 10 CFR part 51, provided however that the draft and final environmental impact statements prepared by the Commission focus on the environmental effects of construction and operation of a reactor or reactors which have characteristics that fall within the postulated site parameters..."* (emphasis added).

We conclude that the PPE approach is sufficient for a NEPA review for two main reasons. First, NEPA does not require the NRC to adopt any particular internal decision making structure, so long as the process implemented by the agency assures a "hard look" at the potential environmental consequences of the proposed action<sup>2</sup>. The PPE approach satisfies this requirement.

Second, federal case law supports the legality of considering the "upper bound of reasonably foreseeable environmental costs"<sup>3</sup> as would be done through a NEPA evaluation based on PPE data. *NRDC v. NRC*, perhaps the seminal case on this issue, lays out the state of law so clearly it is worth quoting:

An agency can [consider the environmental risks of a proposed action] by having the appropriate decisionmakers consider all that is known and unknown about the risks before deciding whether to take an action. Or it can organize its decisionmaking process in such a manner that the appropriate decisionmakers consider only the upper bound of reasonably foreseeable environmental costs. Either method of considering and

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<sup>2</sup>*Baltimore Gas and Electric* and, later, *Kelley v. Selin*, both of which specifically involved the NRC, are cited for the proposition that NEPA does not require agencies to adopt any particular internal decisionmaking structure so long as the requisite "hard look" is achieved.

<sup>3</sup> *NRDC v. NRC*, 685 F.2d 459, 486 (D.C. Cir. 1982).

disclosing uncertainties surrounding an environmental effect is acceptable under NEPA. Thus, to the extent that the Commission has listed the upper bound of reasonably foreseeable gaseous and liquid effluent releases in Table S-3, we hold that it has complied with NEPA. [footnote omitted].

Two specific areas of NEPA review were the subject of significant industry – NRC discussion regarding how the PPE approach would satisfy NEPA requirements. These were consideration of alternative sites and environmental impact mitigation alternatives. First, as discussed in our August 9 letter, we conclude that the PPE approach permits adequate consideration of alternative sites as required by Part 52 and the NRC's Part 51 implementing regulations for NEPA. Because the fundamental purpose of the application for an ESP is NRC approval of a site suitable for a range of plant types and designs as reflected in the PPE, only those alternatives that serve the purpose of the proposed action need be considered; they need not extend beyond those reasonably related to the purpose of the project. Consequently, the PPE approach, which implements the stated fundamental purpose of the ESP applicant, is fully consistent with the NRC's regulations requiring consideration of alternative sites because it is the applicant's stated purpose and need that defines the scope of alternative sites to be considered. The industry proposed approach for ESP alternate site evaluations is discussed in a separate resolution letter for generic topic ESP-18a, Alternative Site Reviews.

Regarding environmental impact mitigation alternatives, the industry and NRC staff had several discussions on how ESP applications using the PPE approach would satisfy NEPA requirements in this area. In particular, in our public meeting on December 5, we described that ESP applications would identify the scope of mitigation alternatives considered and that the PPE would be supplemented with information on design alternatives to support the reviews required by NEPA.

As discussed with the NRC staff, the consideration of environmental impact mitigation alternatives is not directly related to the use of the PPE approach. The PPE approach provides a basis for quantifying potential environmental impacts and evaluating overall site suitability. To address issues associated with design and mitigation alternatives, additional information beyond that contained in the PPE may be necessary and would be provided in ESP applications.

Each ESP applicant will be responsible for evaluating overall environmental impacts of construction and operation. The applicants will determine the range of design alternatives to be considered at the ESP stage to provide an adequate characterization of environmental impacts and to identify potential for mitigation of significant impacts.



For example, an ESP applicant may consider a range of alternatives for discharging water back to the environment. Alternatives considered might include an outfall structure, a submerged pipe discharging to the receiving body, or a diffuser pipe discharging to the receiving body. The ESP applicant would evaluate the anticipated environmental impact from each alternative. If significant differences in impact are identified, a cost-benefit analysis will be conducted to determine whether an effective mitigation alternative is available. If there is no environmentally preferred alternative among the alternatives considered, then the ESP would impose no constraints on which alternative could be used.

In those cases where environmental impacts are determined to be minor, mitigation alternatives will not be considered cost effective and will not be evaluated in detail.

**Attachment 1 – Part 52/ESP-Related Terminology**

The following terminology is used in this paper to facilitate discussion and understanding of the PPE approach:

1. **Site parameters** – The postulated physical, environmental and demographic features of an as-yet unidentified site. These are the site-related parameters that vendors have assumed in completing a reactor design. They establish the physical, environmental and demographic characteristics that a site must “deliver” if it is to be suitable for the vendor’s reactor or reactors.
2. **Design parameters** – The postulated features of the reactor or reactors that could be built. These features describe design information that is necessary to prepare and review an ESP application. At COL, these will be compared with “design characteristics” of the selected design to determine whether significant new safety or environmental issues exist.
3. **Site characteristics** – The real physical, environmental and demographic features of the proposed facility location. These values are established through data collection and/or analysis and are reported in the applicant’s ESP application. They are developed in accordance with NRC requirements and guidance and form the basis for future comparison (at the COL stage) with “design characteristics” of the selected design to verify that the site is suitable for that design.
4. **Design characteristics** – The real features of a reactor or reactors. At COL, design characteristics are assessed to verify they fall within the site characteristics and design parameters approved in the ESP.

These or similar terms are used throughout 10 CFR Part 52, and we understand that the NRC staff intends to seek public comment on the consistent use of such terminology as part of the forthcoming Part 52 update rulemaking. The industry intends to propose the use of these terms and definitions in response to the Part 52 notice of proposed rulemaking.

Attachment 2 – Sample Early Site Permit

**[ELECTRICITY PRODUCTION COMPANY]**  
**DOCKET NO. 52-###**  
**[FUTURE NUCLEAR POWER SITE]**

Early Site Permit No. ESP-[001]

*{Based on old construction permit wording and current Part 52 regulations}*

1. The Nuclear Regulatory Commission (the Commission) has found that:

- A. The application for an early site permit filed by [Electricity Production Company] (the Applicant) complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set forth in Title 10, Chapter I, Code of Federal Regulations (10 CFR), and all required notifications to other agencies or bodies have been duly made;

*{Based on §52.24}*

- B. The Applicant has sufficiently identified and assessed the site characteristics pertinent to the protection of the health and safety of the public and assessment of environmental impacts for the [Future Nuclear Power Site] (the site);
- C. The Applicant has defined a sufficient set of design parameters for purposes of assessing the safety and environmental impacts of a future nuclear facility or facilities having characteristics that fall within the set of design parameters defined in the application;

*{Based on §52.17}*

- D. On the basis of the foregoing, there is reasonable assurance that, taking into consideration the site criteria contained in 10 CFR Part 100, "Reactor Site Criteria," a reactor, or reactors, having characteristics that fall within the site characteristics and design parameters in the application can be constructed and operated without undue risk to the health and safety of the public;

*{Based on §§52.21, 52.18, and 52.17(a)(1)}*

- E. The issuance of this early site permit will not be inimical to the common defense and security or to the health and safety of the public; and

*{Standard permit and license wording per §103 of the Act}*

- F. There is no significant impediment to the development of any emergency plan;

**alternatively include, (Option 1)**

and major features of the emergency plans submitted by the Applicant are acceptable;

**alternatively include, (Option 2)**

and the emergency plans submitted by the Applicant provide reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency.

*{Based on §§52.18 and 52.17(b)(1) and (2)}*

- G. After considering the environmental review of the site, including effects of construction and operation of a reactor, or reactors, which have characteristics that fall within the site characteristics and design parameters and the evaluation of alternative sites\* presented in the application, the issuance of this early site permit is in accordance with 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," and all applicable requirements have been satisfied.

*{Based on §§52.18 and 52.17(a)(2)}*

*\*reflects current 52.17(a)(2) requirement; Petition for Rulemaking PRM-52-2 is pending as discussed in cover letter*

2. Based on the foregoing findings regarding the site, pursuant to Section 103 of the Act, and 10 CFR Part 52, Subpart A, "Early Site Permits," [and pursuant to the Atomic Safety and Licensing Board's Initial Decision, dated [month, day, year],] the Commission hereby issues Early Site Permit No. ESP-[001] to [Electricity Production Company] for the site in [Town, County, State].

3. This permit shall be subject to all applicable provisions of the Act, and rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the conditions, terms, and limitations specified or incorporated below:

- A. [Electricity Production Company] is authorized to perform activities at the site allowed by 10 CFR 50.10(e)(1) as described in its application; [alternative: No authority to perform activities at the site allowed by 10 CFR 50.10(e)(1) is granted; and

*{Based on §52.25}*

- B. References to this early site permit shall be deemed to include the site characteristics and design parameters identified in the permit application.

*{Based on §52.24 – Reflects proposed language in May 8, 2002, redline draft proposed rule}*

4. Except as provided in 10 CFR 52.25(b) and 52.27 (b) and (c), this permit expires on [20 years after issuance];

*{Based on §§ 52.25(b) and 52.27(a)}*

5. This permit is effective as of its date of issuance and shall expire as set forth in paragraph 4.

**FOR THE NUCLEAR REGULATORY COMMISSION**

**Director, Division  
Office of Nuclear Reactor Regulation**

**Date of Issuance: [Month day, year]**

Status of Generic ESP Interactions

ESP Topic Higher priority topics shaded	Initial Discussion	Resolution Pending	Discussions Ongoing	Next Discussion	NEI Letter	NRC Response	Potential Snr. Mgmt Issue	ESP Schedule Impact if not Resolved by	Remarks
1. ESP application form & content	8/22		x	1/29					NRC provided TOC comparison on Oct. 16
2. ESP inspection guidance	4/24		x	1/29					<ul style="list-style-type: none"> <li>IMC-2501 issued; reflects QA open issue (see ESP-3)</li> <li>ESP Review Std to be issued for use &amp; comment by year end</li> </ul>
2a. Pre-application interactions (voluntary nature, plans for local public mtgs & review fee structure)	4/24	x			11/26				
3. QA requirements for ESP information	5/28	x			12/20			2/1/03	
4. Nominal NRC review timeline	10/17		x	1/29					
5. Mechanism for documenting resolution of ESP issues	5/28				9/10	11/5			
6. Use of plant parameters envelope (PPE) approach	7/16	x			12/20			2/1/03	
7. Guidance for satisfying §52.17(a)(1) requirements	7/16	x			12/20			2/1/03	Related to ESP-6
8. Fuel cycle and transportation impacts (Tables S-3 & S-4)	9/25		x	1/29				3/1/03	
9. Criteria for assuring control of the site by the ESP holder				3/5					
10. Use of License Renewal GEIS for ESP	9/25	x							
11. Criteria for determining ESP duration (10-20 years)	12/5	x			12/20				

ESP-6, Enclosure 2  
December 20, 2002

ESP Topic Higher priority topics shaded	Initial Discussion	Resolution Pending	Discussions Ongoing	Next Discussion	NEI Letter	NRC Response	Potential Snr. Mgmt Issue	ESP Schedule Impact if not Resolved by	Remarks
12. Guidance for evaluating severe accident mitigation alternatives under NEPA	8/22	x			12/20			2/1/03	
13. Guidance for ESP seismic evaluations	6/13		x	1Q03				2 <sup>nd</sup> meeting on pilot demonstration activity planned for 1Q03	
14. Applicability of Federal requirements concerning environmental justice				3/5				Evaluating related PFS decision by Commission	
15. Appropriate level of detail for site redress plans	9/25	x			11/26				
16. Guidance for ESP approval of emergency plans				1/29					
17. Petition to eliminate duplicative NRC review of valid existing site/facility information								Staff recommendation pending on petition PRM-52-1	
18. Petition to eliminate reviews for alternate sites, sources and need for power								Staff recommendation pending on petition PRM-52-2	
18a Alternative site reviews	12/5	x			12/20			3/1/03	
19. Addressing effects of potential new units at an existing site				3/5					
20. Practical use of existing site/facility information	9/25	x			11/26				
21. Understanding the interface of ESP with the COL process.				3/5					
22. Form and content of an ESP	8/22		x	1Q03				2/1/03	NEI draft under consideration by NRC